U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Admin.
NATIONAL OCEAN SERVICE
Damage Assessment Center
Florida Keys National Marine Sanctuary

DATE: 06/27/2002

TO: Sharon Shutler and Gwendolyn Wilkie, NOAA General Counsel
Maureen Malvern and Jerome Johnson, Florida DEP Office of General Counsel

FROM: Kevin Kirsch and Sean Meehan, NOAA Damage Assessment Center, Florida Keys National Marine Sanctuary

SUBJECT: *Class-Sea* vessel grounding assessment report

FFWCC INCIDENT (CASE) #: 02-3A-3533

FFWCC CITATION: 000636B

NAME & DESCRIPTION OF VESSEL: *Class-Sea* (DOC 941998), 48.6' Viking cabin vessel

VESSEL OPERATOR: Victor A. Weiger

DATE AND TIME OF INCIDENT: 4/01/02 @ 1000hrs

LOCATION OF INJURY: Tavernier Key Flat (Tavernier, FL, state of Florida waters)

LAT/LONG POSITION: N 024° 59.7576' W 080° 29.7368' (blowhole #1)
N 024° 59.7563' W 080° 29.7396' (berm)
N 024° 59.7604' W 080° 29.7444' (northwest propscar)

TOTAL AREA IMPACTED:

16.97 m^2 seagrass bottom cover excavated
37.73 m^2 seagrass bottom cover buried
54.70 m^2 seagrass bottom cover impacted (predominately *Thalassia testudinum*)

PHOTO/VIDEO DOCUMENTATION:

Underwater digital video

DISCUSSION

On 04/02/02 Kevin Kirsch and Sean Meehan conducted an injury assessment of the grounding site of the 48.6' Viking cabin vessel *Class-Sea*, Coast Guard documentation #941998 (see Figure 1). The grounding was located with coordinates provided by FFWCC Officer Rewa Maldonado. This grounding occurred on the ocean side of the east end of Tavernier Key flat (See NOAA Chart # 11463). GPS Lat/Long coordinates were taken at several points within the injury.

METHODOLOGIES

Utilizing differentially corrected, surveying-grade DGPS equipment (Trimble® Pro XR with a TSC1 Datalogger), the grounding site was mapped by physically tracing the outlines of the various injury features. The coordinates generated by the tracing work were downloaded to GPS Pathfinder® Office data processing software version 2.70 (Trimble) and then to Arcview® GIS version 3.2a (ESRI), which is used to arrive at square meter area calculations for the injury features. Depth measurements of the larger blowhole were made by passing an inflatable 8' boat back and forth over the injury equipped with a Garmin® 185 Depth Sounder integrated with a Trimble® Pro XR DGPS mounted on the stern. Depth readings taken by the Garmin are incorporated with differentially corrected positions taken by the Trimble. The depths of the other blowholes was measured with a graduated staff supporting the Trimble antenna. This information is then processed using Arcview® GIS version 3.2a with the 3D Analyst Extension resulting in a 3 dimensional view of the area. Measurements were made using the water surface as the level plane.

Community composition, percent cover and density of the benthic community, both in the injured area and in the surrounding undisturbed area, were assessed using a modified Braun-Blanquet technique (Kenworthy and Schwarzchild, 1997; Braun-Blanquet, 1932). This method involves placement of a $0.25m^2$ quadrat on the substrate and visually inspecting the content of the quadrat. The submerged aquatic vegetation (seagrass and macroalgae) and/or coral are identified and assigned a cover-abundance scale value. The scale values are: 0.0 = not present, 0.1=solitary specimen, 0.5=few with small cover, 1=numerous but less than 5% cover, 2=5-25% cover, 3=25-50% cover, 4=50-75% cover, and 5=75-100% cover. In order to determine the percent cover per individual species, as well as the total seagrass cover, the Braun-Blanquet scores by species and total cover are averaged over all of the quadrats assessed within each feature (injured area, undisturbed area). The point estimates of percentage cover corresponding to these average Braun-Blanquet scores are then calculated using the attached conversion table (see Appendix A). The loss of percent cover of seagrass as a result of the grounding can then be assessed by comparing the percent cover of the injured area to that of the undisturbed area immediately adjacent to the injury.

DESCRIPTION OF INJURY

This grounding occurred on a seagrass flat characterized as a *Thalassia testudinum* dominated seagrass community. Other living components include sponges and other invertebrates typical of seagrass meadows in this area of the FKNMS, various species of macroalgae, and numerous species of fishes. The sediments consist of carbonate sands, muds and coarse shell fragments.

The grounding consisted of a set of twin propscars, three blowholes, a berm, and a single keel scar (see Figure 2). The twin propscars travel at approximately 30°T across the flat. The northwestern scar was 7.28 meters long with an average width of 0.375 meters. The southeastern scar was 4.05 meters long with an average width of 0.20 meters (see Figure 3). To the southeast of the twin propscars, the first of three blowhole starts. The three blowholes line up on a bearing of 113°T. The first blowhole has an area of 0.39 meters^2 with a depth of 0.47 meters (see Figure 4). The second blowhole has an area of 0.29 meters^2 with a depth of 0.25 meters. The third blowhole is the largest of the three with an area of 9.47 meter^2 (see Figure 5). The maximum depth measured in this blowhole was 1 meter below the surround seafloor (see Figure 6). The total volume of material excavated is calculated to be 4.69 meters^3. The material ejected from the third blowhole created a berm burying an area of 37.73 meters^2 of seagrass (see Figure 7). Sods of seagrass were found inverted on the berm. These sods were correctly oriented and placed in the first and second blowholes in an effort to preserve the resource (see Figure 8). The survival of these sods is unknown as of the writing of this report.

The total area impacted is calculated to be 54.70 m^2 of seagrass bottom cover, predominately *Thalassia testudinum* (Turtle grass).

Using the Braun-Blanquet technique, one species of seagrass (*Thalassia testudinum*)was noted within the trench and berm injury caused by the *Class-Sea*. However, this one species comprised less than 1.00% of the bottom cover (see Table 1). No species of seagrass were noted within the blowhole injury. In the surrounding undisturbed areas, one species of seagrass (*T. testudinum*) was found (see Table 2). **The dominant seagrass in this area is *Thalassia testudinum* (Turtle grass) with an average percent cover of 42.0%.**

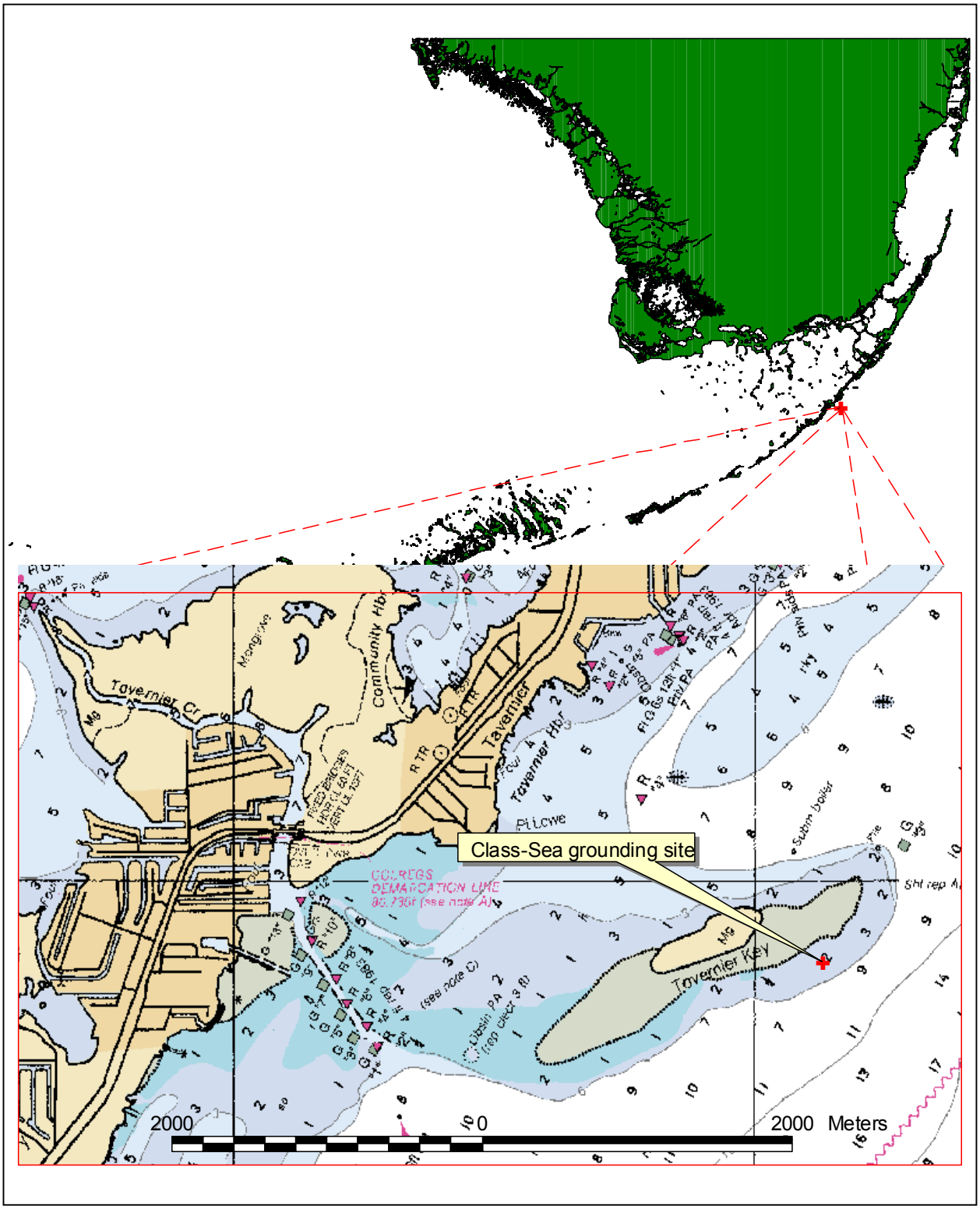

Figure 1. Location of Class-Sea grounding site (NOAA Chart 11463).

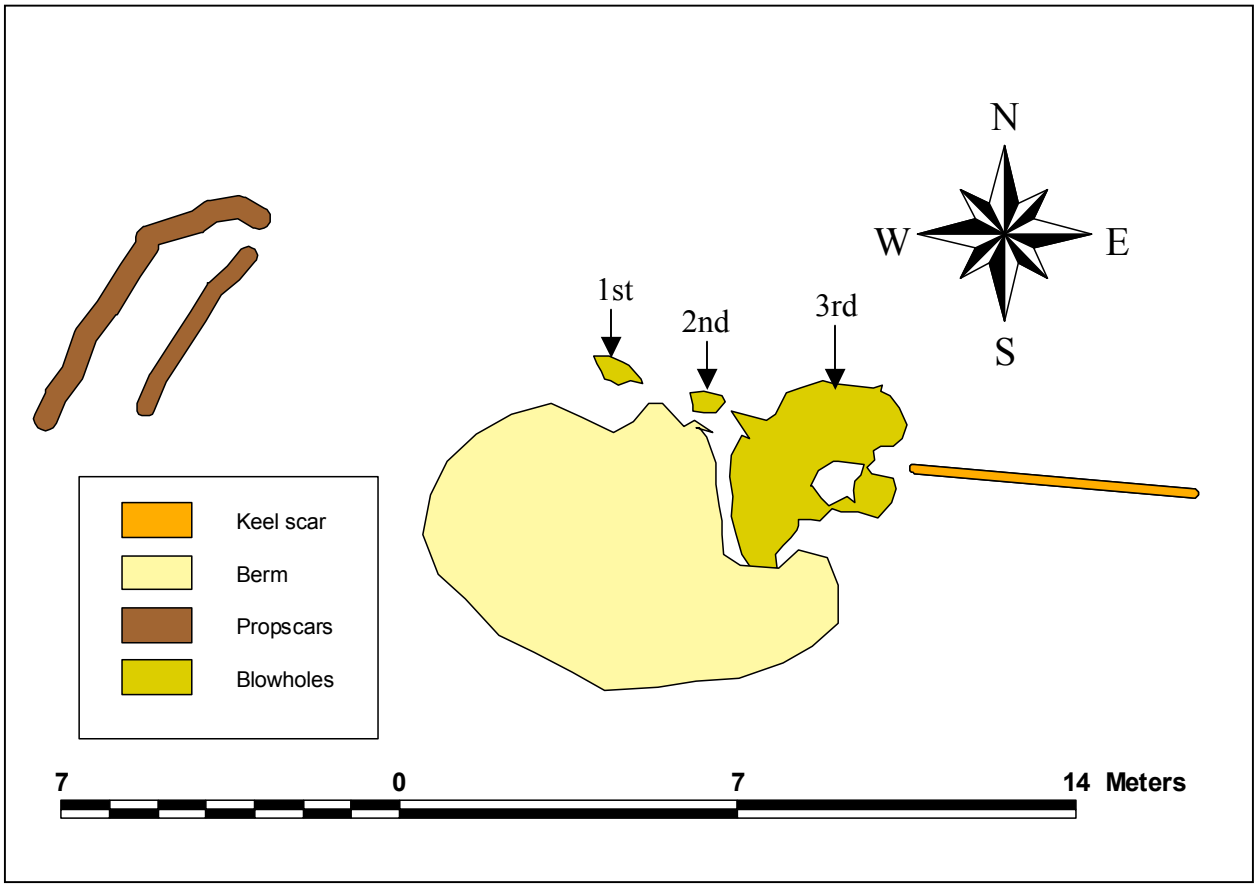

Figure 2. Physical dimensions of the *Class-Act* grounding injury.

Figure 3. Photo of southeast propscar.

Figure 4. Photos of first and second blowholes

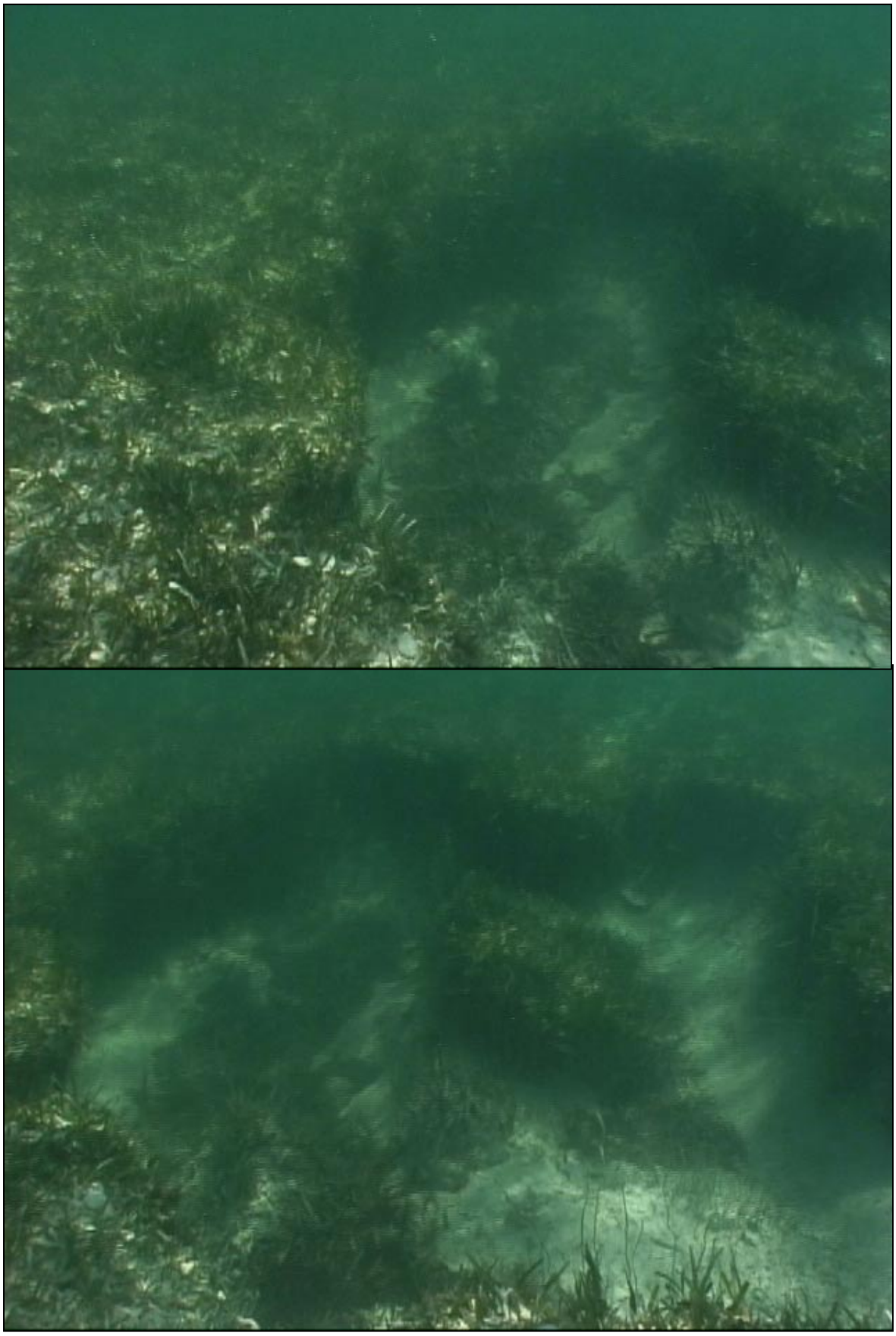

Figure 5. Photos of third blowhole.

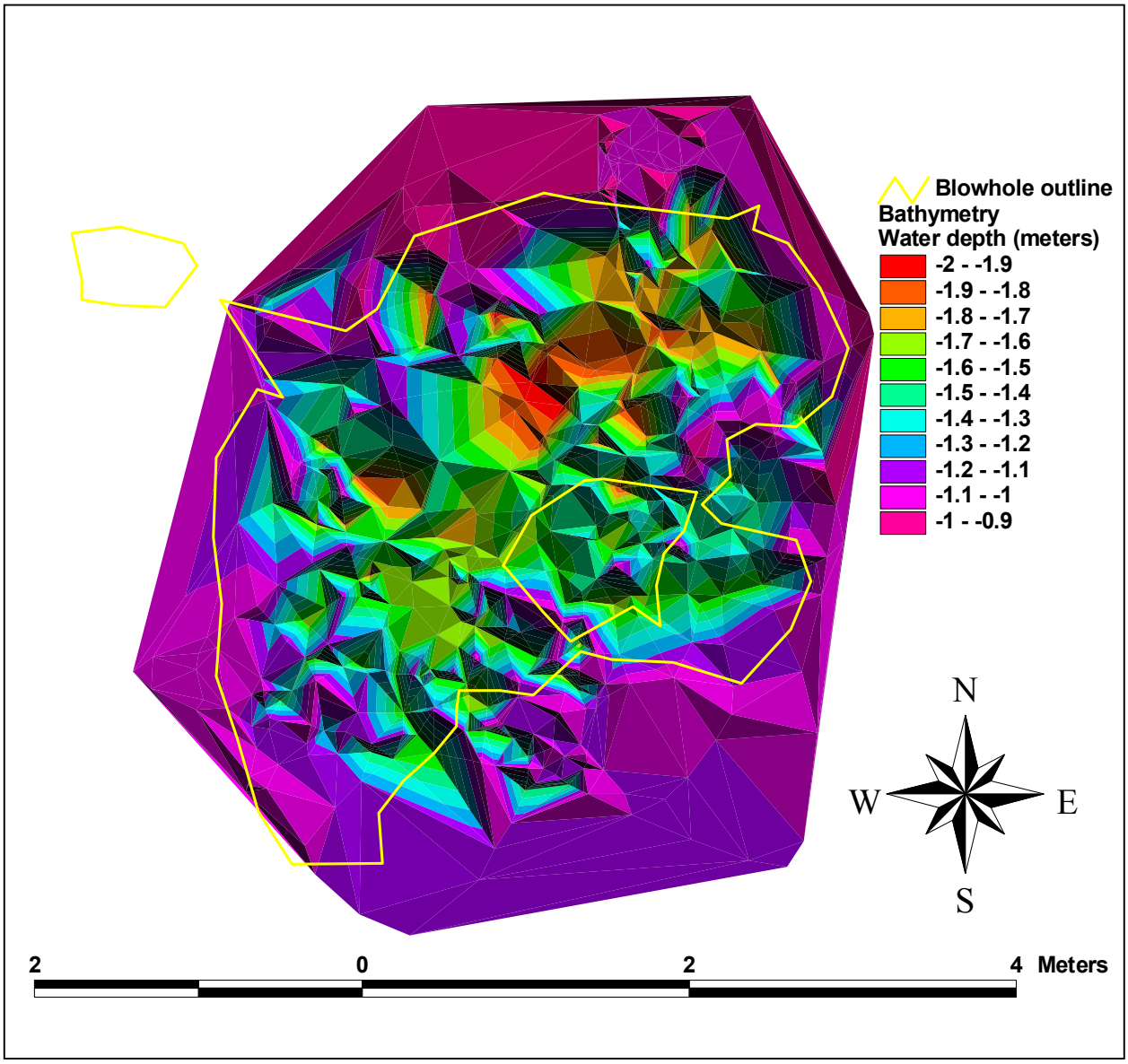

Figure 6. Bathymetry of the third blowhole.

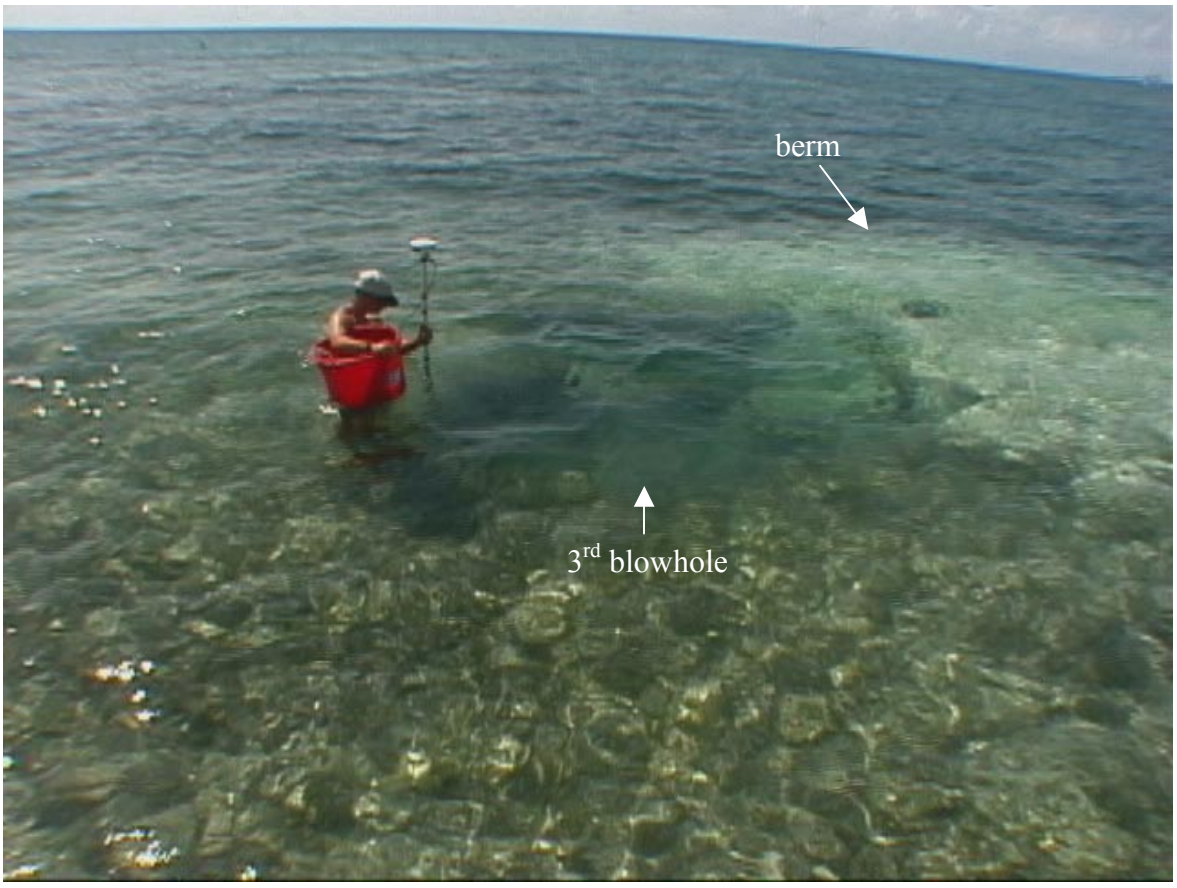

Figure 7. Photos of the berm and the third blowhole.

Figure 8. Sod of seagrass placed in a blowhole.

Table 1. Summary of Raw Braun-Blanquet Scores (See Braun- Blanquet scores in Appendix B)

	Species	Blow Hole	Berm Scar	Trench Scar	Control
Density[1]	*T. testudinum*	0	0.33	0.5	3.17
	H. wrightii	0	0	0	0
	S. filiforme	0	0	0	0

1) Density = D_i = SUM (S_{ij}/n)

D_i = density of species i
j = quadrat number
S_{ij} = BB score for species i in quadrat j
n = total number of quadrats in transect

Table 2. Braun - Blanquet Scores converted into percent cover. (See Conversion Table in Appendix C)

	Species	**Inside Injury**	**Surrounding Habitat**
Percent Cover	*T. testudinum*	1.0 %	42.0%
	H. wrightii	0 %	0 %
	S. filiforme	0 %	0 %
	TOTAL		**42.0 %**

REFERENCES

Braun-Blanquet, J. 1932. *Plant Sociology*- the study of plant communities. G.B Fuller and H.S Conrad, Eds. Koeltz Scientific Books. Koenigstein. West Germany.

Kenworthy W.J. and A. Schwarzchild. 1997. Vertical growth and short shoot demography in *Syringodium filiforme* in outer Florida Bay, USA. Marine Ecology Progress Series. vol 173. pp. 25- 37.

Appendix A: *Class-Sea* - Braun Blanquet Damage Assessment and Habitat Characterization

Percent Cover and Services Lost

Species	Category	Aboveground percent of total per species in Control Site	Percent Cover in Control Site	Percent Cover Remaining in Blow Hole	Percent of Services Lost in Blow Hole	Percent Cover Remaining in Berm/Trench Scar	Percent of Services Lost in Berm/Trench Scar
T. testudinum	Density	100.00%	42.0%	0.00%	42.0%	1.00%	41.0%
H. wrightii	Density	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
S. filiforme	Density	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Total		100.00%	**42.0%**				

Average Braun Blanquet Scores

Species	Category	Blow Hole	Berm Scar	Trench Scar	Control
T. testudinum	Density	0	0.33	0.5	2.11
H. wrightii	Density	0	0	0	0
S. filiforme	Density	0	0	0	0

Prepared by: **NOAA Damage Assessment Center, Marathon, FL**

Appendix B: *Class-Sea* - Blanquet Scores

Quad #	Injury	*T.t.*	*S.f.*	*H.w.*	Total Grass	TMA	Coral	Sed. Type
1	C	2	0	0	2	0	1	S
2	C	3	0	0	3	0	1	S/CS
3	C	3	0	0	3	0	0	S
4	C	3	0	0	3	0	0	S
5	C	4	0	0	4	0	0	S
6	C	4	0	0	4	0	0	S
Average		**3.17**	**0.00**	**0.00**	**3.17**	**0.00**	**0.22**	
7	TR	0	0	0	0	0	0	MS
8	TR	1	0	0	0	0	0	MS
Average		**0.5**	**0**	**0**	**0**	**0**	**0**	
9	BM	0	0	0	0	0	0	MS/CS
10	BM	0	0	0	0	0	0	MS/CS
11	BM	1	0	0	0	0	0.1	MS
Average		**0.33**	**0**	**0**	**0**	**0**	**0.03**	
12	BH	0	0	0	0	0	**0**	MS
13	BH	0	0	0	0	0	0	MS
14	BH	0	0	0	0	0	0	MS
15	BH	0	0	0	0	0	0	MS
16	BH	0	0	0	0	0	0	MS
Average		**0**	**0**	**0**	**0**	**0**	**0**	

KEY TO ABBREVIATIONS

Species:
T.t. = Thalassia testudinum
S.f. = Syringodium filiforme
H.w. = Halodule wrightii
TMA = Total Macroalgae

Sediment Types:
M= Mud
MS = Muddy Sand
SM = Sandy Mud
R = Rock
CS = Coarse Shell
HH = Halimeda Hash
RB = Rubble
LC = Live Coral

Injury Regions:
TR = Trench
BH = Blow Hole
BM = Berm
C = Control (Reference)

Appendix C: Braun-Blanquet Score to Percent Cover Conversion Tables

Interpolation of the Mid-Point of BB Scores			
BB Score	% Cover	BB Score	% Cover
0.00	0.00%	2.60	28.50%
0.10	1.00%	2.70	30.75%
0.20	1.00%	2.80	33.00%
0.30	1.00%	2.90	35.25%
0.40	1.00%	3.00	37.50%
0.50	1.00%	3.10	40.00%
0.60	1.00%	3.20	42.50%
0.70	1.00%	3.30	45.00%
0.80	1.00%	3.40	47.50%
0.90	1.00%	3.50	50.00%
1.00	2.50%	3.60	52.50%
1.10	3.75%	3.70	55.00%
1.20	5.00%	3.80	57.50%
1.30	6.25%	3.90	60.00%
1.40	7.50%	4.00	62.50%
1.50	8.75%	4.10	65.00%
1.60	10.00%	4.20	67.50%
1.70	11.25%	4.30	70.00%
1.80	12.50%	4.40	72.50%
1.90	13.75%	4.50	75.00%
2.00	15.00%	4.60	77.50%
2.10	17.25%	4.70	80.00%
2.20	19.50%	4.80	82.50%
2.30	21.75%	4.90	85.00%
2.40	24.00%	5.00	87.50%
2.50	26.25%		

BB Score	Mid-Point Range
<1= <1%	<1= 1%
1=1%-5%	1=2.5%
2= 5%-25%	2=15%
3= 25%-50%	3=37.5%
4= 50%-75%	4=62.5%
5= 75%-100%	5=87.5%